Game Manual

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The VEX IQ Challenge

Innovation and ingenuity are the hallmarks of remarkable advancements in the fields of science, technology, engineering and mathematics (STEM). The VEX IQ Challenge was designed to provide students with open-ended challenges that allow them to explore and gain firsthand experience in STEM fields. Students then have the opportunity to develop real-world connections to what they are learning in the classroom.

Working with robots in a collaborative game format can be a very powerful tool to engage students and enhance their math and science skills through hands-on, student-centered learning. Through participation in the VEX IQ Challenge, students can develop the essential life skills of teamwork and collaboration, as well as the critical thinking, project management, and communication skills required to become the next generation of innovators and problem solvers in our global society.

The VEX IQ Challenge, presented by the Robotics Education & Competition Foundation (REC Foundation), is designed to inspire students to develop a lifelong passion for learning and an interest in pursuing educational and career opportunities in STEM fields.

For additional information, visit www.vexrobotics.com and www.roboticseducation.org/vex-iq-challenge

You can also follow us on Twitter @VEXRobotics and @REC_Foundation

Like us on Facebook at www.facebook.com/vexrobotics and www.facebook.com/RECFoundation

VEX IQ Challenge – *Add It Up* – A Primer

VEX IQ *Add It Up* is played on a 4 ft x 8 ft field, surrounded by a 2.5 inch tall perimeter. There are eight goals and four rings into which teams can score forty balls of varying sizes.

The Challenge theme this season is mathematics (math). The point values used for scoring the game form a segment of the Fibonacci sequence. In the Fibonacci sequence, each subsequent number is the sum of the previous two, i.e., 1,2,3,5,8. Teams can learn more about the Fibonacci Sequence and other math concepts by participating in this season's VEX IQ Challenge. The Challenge includes the exciting *Add It Up* robot game and the STEM Research Project. For more details on the STEM Research Project, visit www.roboticseducation.org/vex-iq-challenge/viq-current-game/

VEX IQ *Add It Up* provides an opportunity for students, with the guidance of an adult mentor, to build a VEX IQ robot to solve exciting math challenges. Students collaborate with their own teammates and then also with other teams, in an alliance format, to *Add It Up* for the highest game score.

Students develop a tremendous sense of accomplishment in building a robot to solve the VEX IQ Challenge. Teachers, mentors, and parents will take pride in the fact that students are able to design, build, and program a VEX IQ robot with minimal adult assistance.

The Game

Game Description

Matches are played on a field set up as illustrated in the figure below. The **Robot Skills Challenge, Programming Skills Challenge** and the **Teamwork Challenge** use the exact same field and set up.

In the Robot Skills Challenge, one robot takes the field to score as many points as possible under driver control.

In the Programming Skills Challenge, one robot scores as many points as possible autonomously.

In the Teamwork Challenge, an *Alliance* of two robots works together in each *Match*.

The object of the game is to attain the highest score by *Scoring Balls* in *Floor Goals*, *Low Goals*, *High Goals*; *Filling Rings,* and by having your *Robot Hanging* at the end of the match.
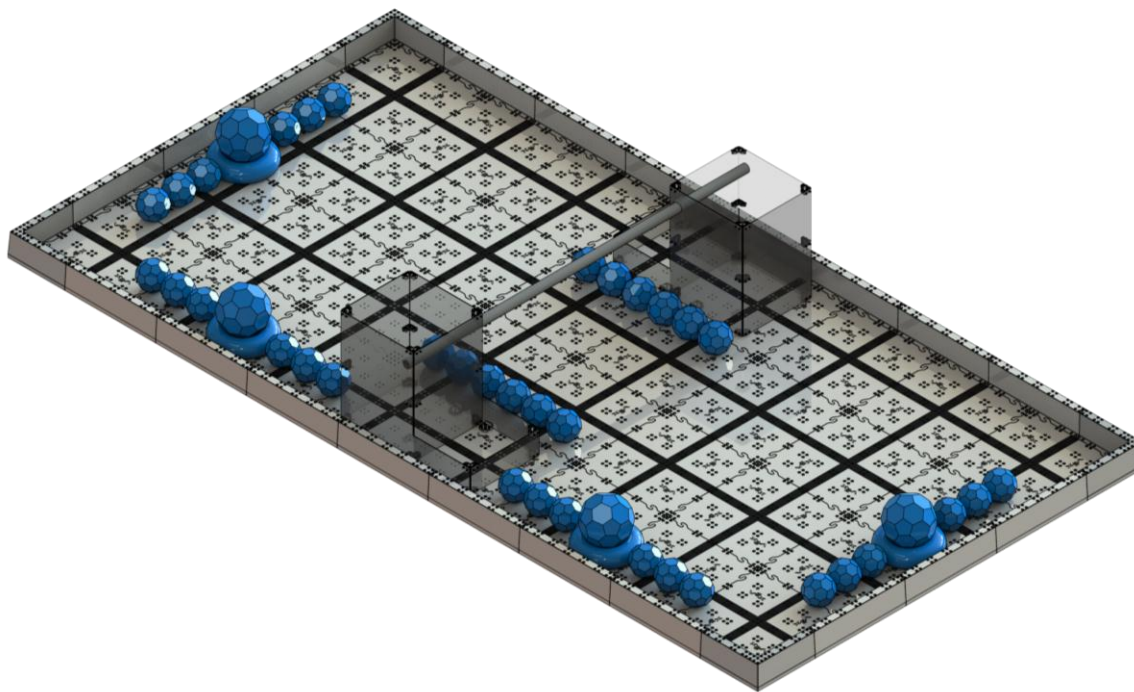

Figure 1 – *Isometric Drawing of the Field*

There are a total of thirty-six (36) *Small BuckyBalls* and four (4) *Large BuckyBalls* available as *Scoring Objects* in the game. There are four (4) *Floor Goals*, two (2) *Low Goals*, two (2) *High Goals*, and four (4) *Scoring Rings*, as well as a *Hanging Bar*.

Game Definitions

Adult – Anyone not meeting the definition of *Student*.

Alliance – A pre-assigned grouping of two teams that work together for a given *Teamwork Match*.

Alliance Score – Points scored in a *Teamwork Match* awarded to both robots.

Disqualification – A penalty applied to a team for a behavioral violation. A team who is *Disqualified* in a *Teamwork Match* receives zero (0) points. At the head referee's discretion, repeated violations and *Disqualifications* for a single team may lead to its *Disqualification* for the entire event.

Driver – A *Student* team member responsible for operating and controlling the *Robot*.

Driver Station – The region located behind each team's half of the long wall, on the non-audience side of the field, where the *Drivers* must remain during their *Teamwork Match*.

Field Element – The field perimeter, *Bar*, *Low goals*, *High Goals, Scoring Rings* and all supporting structures.

Filled – A *Scoring Ring* is *Filled* if there is a *Small BuckyBall* inside of it, and the *Small BuckyBall* is only touching the *Scoring Ring* or the *Floor* inside the *Scoring Ring*.

Floor – The part of the playing field that is within the outer walls.

Floor Goal – One of the four 6" square shaped goals located in the corners of the field, into which teams place *Balls*. The black lines surrounding the goal mark the outer edges of the goal.
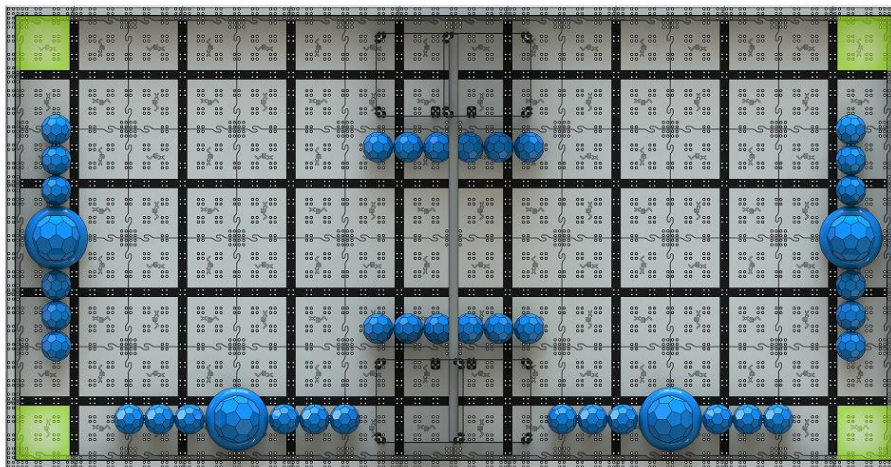

Figure 2 – Overhead view of the field, with the Floor Goals highlighted in green

Game Object – A *Ball* or a *Scoring Ring*.

Goal – A *Floor goal*, a *Low Goal,* or a *High Goal*.

Hanging – A *Robot* is considered to be *Hanging* if it is touching the *Hanging Bar* and not touching the floor or the top of any *Goal*.

Hanging Bar – The 10" high, horizontal PVC pipe supported by the *High Goals*

High Goal – One of the two (2) 12" tall, 9.5" x 9" rectangular-shaped field structures into which teams place *Balls*.

Large BuckyBall – A blue truncated icosahedron-shaped plastic *Scoring Object* with an overall diameter of 5". Each *Large BuckyBall* weighs approximately 0.25 lbs.

Low Goal – One of the two (2) 3.5" tall, 7.5" x 9" rectangular-shaped field structures into which teams place *Balls*.

Robot – Anything that has passed inspection that a team places on the field prior to the start of a *Match*.

Scored – A *Scoring Object* is *Scored* in a *Goal* if it is within the three-dimensional space defined by the outer edges of the *Goal*, projected upwards and infinitely perpendicular to the playing field. Note: The *Scoring Object* must not be touching a *Robot.*

Scoring Object – A *Small BuckyBall* or a *Large BuckyBall*

Scoring Ring – A blue torus-shaped plastic scoring object with an overall diameter of 7" and a "hole" diameter of 3" and a "tube" diameter of 2".

Small BuckyBall – A blue truncated icosahedron-shaped plastic *Scoring Object* with an overall diameter of 3.125". Each *Ball* weighs approximately 0.11 lbs.

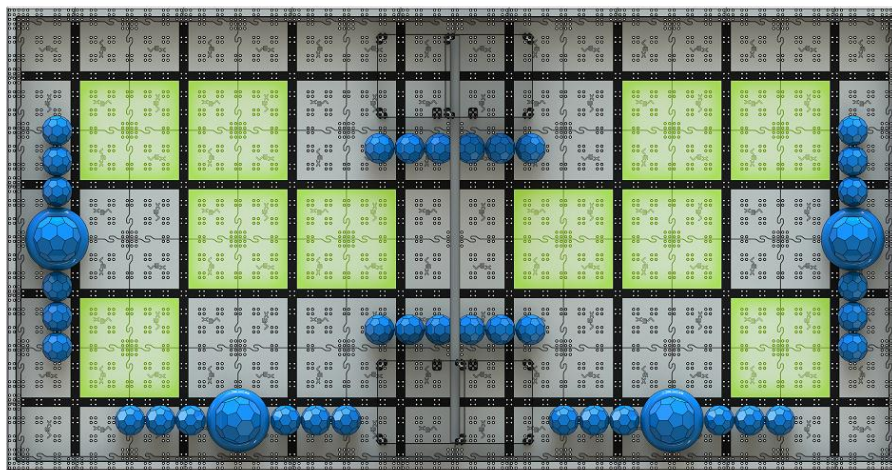*Starting Tile* – Any of the ten (10) unoccupied 11" squares on the field.

Figure 3 – *Overhead view of the field, with the Starting Boxes highlighted in green*

Student – Anyone enrolled in a school or is home-schooled up through and including Middle School grade levels. Students can also be appropriately aged members of a community/youth organization or just a neighborhood group of students. Students should be the individuals, who design, build, and program the robot, with minimal adult assistance.

The definition of elementary school, middle school, and high school enrollment determines student qualifications for VEX IQ. When a school has two or more groups together (K-8, K-12, 6-12), 9th grade is classified as high school, 6-8th grade as middle school, and below 6th grade as elementary school. The elementary and middle school students would be qualified to participate on a VEX IQ team. If the student is enrolled in a stand-alone school/district, which is classified differently by one year (middle school includes grades 7-9 and elementary is grades K-6), then the first definition applies and the 9th grade student is eligible to participate on a VEX IQ team.

Team – One or more middle school, elementary school or equivalent *Students*. Middle school or elementary school designation is determined by the highest grade level or equivalent on the team. Teams may be associated with schools, community/youth organizations, or even a group of neighborhood *Students*.

Teamwork Match – A *Match* consists of a *Driver Controlled Period* for a total time of 1:00 (sixty seconds).

Add It Up Game Rules

Scoring

- A *Small BuckyBall Scored* in a *Floor Goal* is worth one (1) point for the A*lliance Score*.
- A *Small BuckyBall Scored* in a *Low Goal* is worth two (2) points for the A*lliance Score*.
- A *Small BuckyBall Scored* in a *High Goal* is worth three (3) points for the A*lliance Score*.
- A *Large BuckyBall Scored* in a *Floor Goal* is worth three (3) points for the *Alliance Score*.
- A *Large BuckyBall Scored* in a *Low Goal* is worth five (5) points for the *Alliance Score*.
- A *Scoring Ring* that is *Filled* with a *Small BuckyBall* is worth five (5) points for the A*lliance Score*.
- A *Large BuckyBall* in a *High Goal* is worth eight (8) points for the *Alliance Score*.
- A *Robot* that is *Hanging* at the end of the *Match* is worth eight (8) points for the *Alliance Score.*

Safety Rules

<S1> If, at any time, the *Robot* operation or team actions are deemed unsafe or have damaged the *Field Elements* or *Scoring Objects*, by the determination of the referees, the offending team may be *Disqualified*. The *Robot* will require re-inspection before it may again take the field.

General Game Rules

<G1> When reading and applying the various rules in this document, please remember that common sense always applies in the VEX IQ Challenge.

<G2> At the beginning of a *Teamwork Match*, each *Robot* must:
    a. Only contact the *Floor* within a *Starting Tile* on its own side of the field.
    b. Not extend more than 12" above the *Floor* until the *Teamwork Match* begins.

An offending *Robot* will be removed from the match at the Head Referee's discretion.
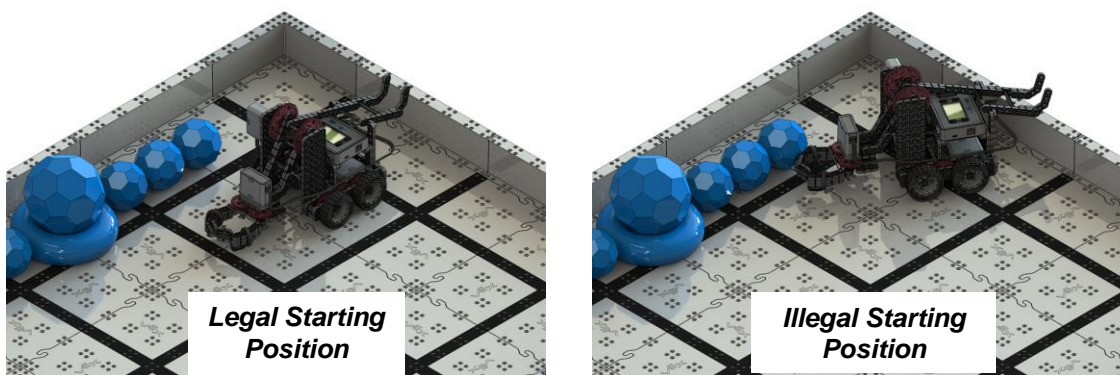

Legal Starting Position

Illegal Starting Position

Figure 4 & 5 – *Examples of a Legal and Illegal Starting Position*

<G3> Each team shall include two *Drivers*. Teams with only one *Student* member are granted an allowance to use only one *Driver*; however, for a variety of reasons, we do discourage single student teams and strongly encourage all teams to have multiple *Student* members.

<G4> During a *Teamwork Match*, the *Drivers* must remain in their *Driver Station*.

<G5> *Robots* begin the *Match* on the *Floor*, in a *Starting Tile* on their side of the field, not touching any *Game Objects* or *Field Elements.*

<G6> *Drivers* are prohibited from making intentional contact with any *Game Object*, *Field Element* or

Robots during a *Match.* Any intentional contact may result in a *Disqualification*. Accidental contact will not be penalized, unless the contact directly impacts the final outcome of the match. This type of accidental contact may result in a *Disqualification*.

<G7> During a *Match*, *Robots* may only be operated by the *Drivers*. If a team consists of more than one student, there will be two drivers who must switch between :25 and :35 remaining in the *Match.* The second *Driver* may not touch his/her team's controls until the controller is passed to him/her. Once the controller is passed, the first *Driver* may no longer touch his/her team's controls. Violations of this rule will result in a warning for minor offenses that do not affect the match. Egregious (match affecting) offenses will result in a *Disqualification*. Teams who receive multiple warnings may also receive a *Disqualification,* at the head referee's discretion.

<G8> *Game Objects* that leave the playing field will be promptly returned to the playing field at the location nearest the point at which they exited.
      a. *Game Objects* will never be returned to the field in a *Scored* position.

<G9> Scores will be calculated for all *Matches* immediately after the *Match,* once all objects on the field come to rest.

<G10> *Robots* may not intentionally detach parts during any *Match*, or leave mechanisms on the field. If an intentionally detached component or mechanism affects game play, the team shall be *Disqualified* at the referee's discretion. Multiple intentional infractions may result in *Disqualification* for the entire event.

<G11> *Robots* must be designed to permit easy removal of *Game Objects* from any grasping mechanism without requiring that the *Robot* have power after the *Match*.

<G12> Field tolerances may vary by as much as ±1", so teams must design their *Robots* accordingly.

<G13> Replays are at the discretion of the event organizer and head referee, and will only be issued in the most extreme circumstances.

<G14> All teams are expected to conduct themselves in a respectful and professional manner while participating in VEX IQ Challenge events. If team members are disrespectful or uncivil to event staff, volunteers or fellow teams, they may be *Disqualified* from their current or upcoming *Match*. It is important to remember that we are all judged based on how we deal with adversity. It is important that we all exhibit maturity and class when dealing with any difficult situations that may present themselves in both the VEX IQ Challenge and life in general.

We count on the adults to embody and model respect, courtesy, and a positive attitude, both at an event and in the design/building process leading up to an event. In all aspects of the VEX IQ program, the students make the decisions and do the work, with adult mentorship. Students and adults are expected to showcase sportsmanship and positive conduct at all times, especially during emotional moments. The VEX community prides itself on being a positive learning environment, where no one, especially an adult, ever harasses, berates or places unnecessary stress upon students and/or event volunteers. We view stressful and difficult situations as teachable moments to model positive behaviors.

<G15> If a *Robot* goes completely out-of-bounds (outside the playing field), gets stuck, tips over, or otherwise is in need of assistance, the *Drivers* may retrieve and reset the robot. In the process they must move the *Robot* such that it is touching the field perimeter. Before retrieving their *Robot*, the team must signal the referee by placing their controller down such that it is not in the hands of either driver.

This rule is intended to help teams keep their robots functional during the match. It is intended so teams can fix damaged robots, or help get their robots "out of trouble." It is not intended for teams to use as part of a strategy to gain an advantage in a match. If referees see teams intentionally or repeatedly doing this, they may be disqualified from said match.

<G16> All rules in this manual are subject to changes, and are not considered official until June 1. 2013. We do not expect any major changes to take place, however we do reserve the right to make changes until June 1st, 2013. Teams are strongly encouraged to review the VEX IQ forum for rule updates and clarifications: www.vexiqforum.com

Robot Inspection

Description

Every *Robot* will be required to pass a full inspection before being cleared to participate in the Challenge. This inspection will ensure that all *Robot* rules and regulations are met. Initial inspections will typically take place during team registration/practice time. Every team should use the rules below as a guide to pre-inspect their *Robot* and ensure that it meets all requirements.

Definitions

Robot – An operator controlled vehicle designed and built by a VEX IQ Challenge team to perform specific tasks on the field. The robot may be constructed using only the VEX IQ platform parts. No other parts will be allowed on the *Robot*.   Prior to participating in the robot matches, each *Robot* will be required to pass an inspection.   Additional inspections may be required at the discretion of event personnel.

Inspection Rules

<R1> The team's *Robot* must pass inspection before being allowed to participate in any *Matches*. Noncompliance with any *Robot* design or construction rule may result in disqualification of the *Robot* at an event.

<R2> Each *Robot* must display its team number, making it no larger than 2"x3".

<R3> At the start of each Match, the *Robot* must satisfy the following constraints.
   a.   Only touching the *Floor* within a *Starting Box*, i.e. a 11" x 11" square
   b.   No taller than 12"
Robots may hang outside of this box, provided they do not touch any other part of the field. Robots may expand beyond their starting size constraints after the start of a match.

<R4> The starting configuration of the *Robot* at the beginning of a match must be the same as a *Robot* configuration inspected for compliance, and within the maximum allowed size.
   a.   Teams using more than one *Robot* configuration at the beginning of matches must tell the inspector(s) and have the *Robot* inspected in its largest configuration(s).
   b.   A team may NOT have their *Robot* inspected in one configuration and then place it at the start of a match in an uninspected configuration.

<R5> Robots may be built ONLY from Official **Robot** Components from the VEX IQ product line, unless otherwise specifically noted within these rules.
   a.   During inspections if there is a question about whether something is an official VEX IQ component, a team will be required to provide documentation to an inspector, which proves the component's source. Such types of documentation include receipts, part numbers, or other printed documentation.
   b.   Only the VEX IQ components specifically designed for use in Robot construction are allowed. Using additional components outside their typical purpose is against the intent of the rule (i.e. please don't try using VEX IQ apparel, team or event support materials, packaging or other non-robot products on a VEX IQ Challenge Robot).
   c.   Products from the VEX Robotics Design System or VEXpro product line cannot be used for robot construction. Products from the VEX product line that are also cross listed as part of the VEX IQ product line are legal.
   d.   Official Robotics Components from the VEX IQ product line that have been discontinued are still legal for robot use. However teams must be aware of <R5a>

<R6> Official VEX IQ products are ONLY available from VEX & Official VEX Resellers. To determine whether a product is "official" or not, consult www.vexrobotics.com/vexiq

<R7> Robots are allowed to use the following additional "non-VEX IQ" components:
   a. Teams may add non-functional decorations provided that these do not affect the robot performance in any significant way or affect the outcome of the match. These decorations must be in the spirit of the event. Inspectors will have the final say in what is considered "nonfunctional".
      i. Any decorations must be backed by legal materials that provide the same functionality, i.e. if your robot has a giant decal that prevents *Game Objects* from falling out of the robot, the decal must be backed by VEX IQ material that also prevents the *Game Objects* from falling out
      ii. The use of non-toxic paint is allowed as a non-functional decoration. However, teams should be careful, as the use of paint may affect how VEX IQ parts "snap" together. Also, any paint being used as an adhesive would be classified as functional.
      iii. Any materials used to comply with <R2> are allowed, provided that they do not violate <R7a>

<R8> Additional VEX IQ products that are released during the challenge season are considered legal for use.
   a. Some "new" components may have certain restrictions placed on them upon their release. These restrictions will be documented in a Team Update. Team Updates will be posted to the "VEX IQ Challenge *Add It Up*" home page in the Competition section of www.VEXrobotics.com

<R9> Robots must use ONLY one (1) VEX IQ Robot Brain.
   a. Robot brains, microcontrollers, or other electronic components that are part of the VEX Robotics Design System or VEXpro product line are not allowed.

<R10> Robots may use up to six (6) VEX IQ motors.

<R11> The only allowable sources of electrical power for a VEX IQ Challenge Robot is any single (1) VEX IQ Battery Pack
   a. Additional batteries cannot be used on the robot (even ones that aren't connected).

<R12> Parts may NOT be modified.
   a. Examples of modifications include, but are not limited to, bending, cutting, and painting. In general, VEX IQ components should be considered sacred and not be modified in any way.
   b. <R7ii> is an exception to this rule.

<R13> The following types of mechanisms and components are NOT allowed:
   a. Those that could potentially damage playing field components.
   b. Those that could potentially damage other robots.
   c. Those that pose an unnecessary risk of entanglement.

<R14> A *Robot* is deemed successfully inspected when it has been recorded as "passed" by an Inspector and the inspection form has been signed by the Inspector and a student team member.

The Event

Description

The VEX IQ Challenge will consist of a **Robot Skills Challenge**, a **Programming Skills Challenge,** and a **Teamwork Challenge**. Robot Skills Challenges are entirely Driver controlled, while the Programming Skills Challenges are autonomous. Each *Robot Skills Challenge Match* and *Programming Skills Match* consists of a single robot trying to score as many points as possible. Each Teamwork Challenge consists of two teams, operating as an alliance, to score points. The Teamwork Challenge may include *Practice*, *Qualifying*, and *Finals Matches*.   After the *Qualifying Matches*, teams will be ranked based on their performance. The top teams will then participate in the *Finals Matches* to determine the Teamwork Challenge champions.

Awards will be given to top teams in each format. Awards will also be given for overall performance in the judged criteria.

Definitions

Disqualification – A penalty applied to a team for a behavioral violation. When a team is disqualified in a *Match,* they receive zero (0) points.

Finals Match – A match used to determine champions.

Practice Match – An un-scored match used to provide time for teams to get acquainted with the official playing field.

Programming Skills Match – A *Programming Skills Match* consists of a sixty (60) second *Autonomous Period*

Robot Skills Match – A *Robot Skills Match* consists of a sixty (60) second *Driver Controlled Period*

Qualifying Match – A *Teamwork Match* used to determine the rankings.

Robot Skills Challenge Rules

Please note that all rules from "The Game" section of the manual apply to Robot Skills, unless otherwise specified.

At the beginning of each *Robot Skills Match*, the robot may be placed in any of the ten (10) *Starting Boxes* on the field.

Robot Skills Challenge Scoring

All scoring is the same as outlined in "The Game" section of this manual.
- A *Small BuckyBall Scored* in a *Floor Goal* is worth one (1) point.
- A *Small BuckyBall Scored* in a *Low Goal* is worth two (2) points.
- A *Small BuckyBall Scored* in a *High Goal* is worth three (3) points.
- A *Large BuckyBall* Scored in a *Floor Goal* is worth three (3) points.
- A *Large BuckyBall* Scored in a *Low Goal* is worth five (5) points.
- A *Scoring Ring* that is *Filled* with a *Small BuckyBall* is worth five (5) points.
- A *Large BuckyBall* in a *High Goal* is worth eight (8) points.
- A *Robot* that is *Hanging* at the end of the *Match* is worth eight (8) points.

Robot Skills Challenge Format

- The Robot Skills Challenge field is set up as described in "The Game" section of this manual.
- Teams will play *Robot Skills Matches* on a "first come, first served" basis.
- Teams will be required to participate in a number of *Robot Skills Matches*, to be determined by the event organizers.
- If a team consists of more than one student, there will be two drivers for the *Robot Skills Match*. *Drivers* must switch with between :35 and :25 remaining in the *Robot Skills Match*.
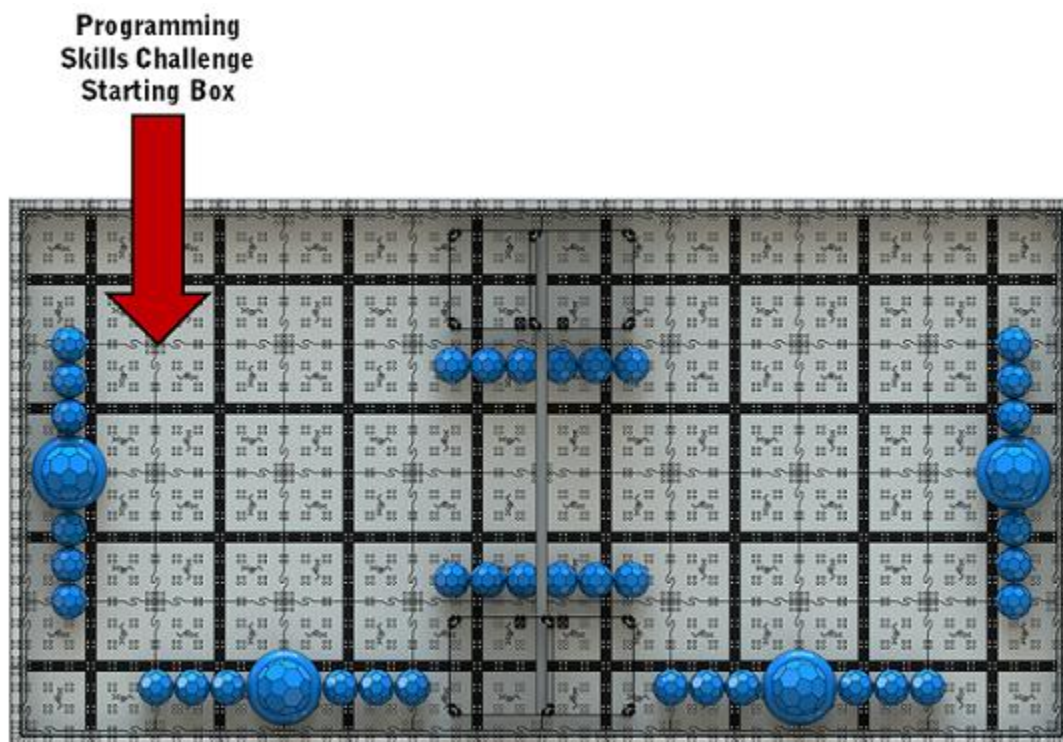
Robot Skills Challenge Rankings

- For each *Robot Skills Match,* teams are awarded a score based on the above scoring rules.
- Teams will be ranked based on their highest *Robot Skills Match* scores, with the team with the highest score being declared the Robot Skills Winner.
- In the case where two teams are tied for the highest score, the tie will be broken by looking at the next highest Robot Skills Match score for both teams, and so on, if necessary.
- If the tie still isn't broken, events may choose to allow teams to have one more deciding match or both teams will be declared the winner.

Programming Skills Challenge Rules

Please note that all rules from "The Game" section of the manual apply to Programming Skills, unless otherwise specified.

At the beginning of each *Programming Skills Match*, the robot must be placed in the **top left** *Starting Box* on the field.

Programming Skills Challenge Starting Box

Programming Skills Challenge Scoring

All scoring is the same as outlined in "The Game" section of this manual.
- A *Small BuckyBall Scored* in a *Floor Goal* is worth one (1) point.
- A *Small BuckyBall Scored* in a *Low Goal* is worth two (2) points.
- A *Small BuckyBall Scored* in a *High Goal* is worth three (3) points.
- A *Large BuckyBall* Scored in a *Floor Goal* is worth three (3) points.
- A *Large BuckyBall* Scored in a *Low Goal* is worth five (5) points.
- A *Scoring Ring* that is *Filled* with a *Small BuckyBall* is worth five (5) points.
- A *Large BuckyBall* in a *High Goal* is worth eight (8) points.
- A *Robot* that is *Hanging* at the end of the *Match* is worth eight (8) points.

Programming Skills Challenge Format

- The Programming Skills Challenge field is set up as described in "The Game" section of this manual.
- Teams will play *Programming Skills Matches* on a "first come, first served" basis.
- Teams will be required to participate in a number of *Programming Skills Matches*, to be determined by the event organizers.

Programming Skills Challenge Rankings

- For each *Programming Skills Match,* teams are awarded a score based on the above scoring rules.
- Teams will be ranked based on their highest *Programming Skills Match* score, with the team with the highest score being declared the Programming Skills Challenge Winner.
- In the case where two teams are tied for the highest score, the tie will be broken by looking at the next highest *Programming Skills Match* score for both teams, and so on, if necessary.
- If the tie still isn't broken, events may choose to allow teams to have one more deciding match or both teams may be declared the winner.

Programming Skills Challenge Specific Rules

<PSC1> Teams may handle their *Robot* as many times as they want during a *Programming Skills Match.*
   a. Upon handling the *Robot*, it must be immediately brought back to a legal starting position
   b. If the *Robot* is possessing any *Scoring Object* when the *Robot* is being handled, these *Scoring Objects* will be removed from the playing field and can no longer be used

<PSC2> Teams must bring their *Robot* controller to the field with them, although drivers start the robot by pressing a button on the brain and may not engage the robot with the controller during the match.

Teamwork Challenge Qualifying Matches

At the event, *Practice Matches* may be played from the team registration time until the drivers meeting begins. Every effort will be made to equalize practice time for all teams, but they may be conducted on a first-come, first-served basis. These matches are not scored, and will not affect team ranking.

Schedule

- The *Qualifying Match* schedule will be available prior to opening ceremonies on the day of the event. This schedule will indicate alliance partners and match pairings. For events with multiple fields, the schedule will also indicate on which field the match will take place.
- The *Qualifying Matches* will start immediately after opening ceremonies in accordance with the qualifying match schedule.
- Teams will be randomly assigned an alliance partner to compete in each *Qualifying Match*.
- All teams will be scored on the same number of *Qualifying Matches*.
- In some cases, a team will be asked to play in an additional *Qualifying Match*, but will not receive credit for playing this extra match.

Teamwork Challenge Rankings ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●

- At the conclusion of each match, the score will be determined.
  - o Each robot will receive the points scored for the Alliance Score
- For a *Qualifying Match*, if **no** member of a team is present in the driver station at the start of a match, that team is declared a "no show" and will receive zero (0) points. A "no show" is treated exactly the same as a *Disqualification*. The team's alliance partner will receive all points scored in this Match.
- Each team will have the same number of *Qualifying Matches*
- Points earned for each team in each *Qualifying Match* are added to get the team's total points
- One out of every four (4) *Qualifying Matches* will not count towards the rankings. If an event has between four (4) and seven (7) *Qualifying Matches* per team, then the lowest score for each team will not be counted. If an event has between eight (8) and eleven (11) rounds, then the two lowest scores for each team will not be counted. If an event has twelve (12) or more rounds, then the three lowest scores will not be counted.
- Teams are ranked by total points.
- Ties in ranking are broken by:
  - o Removing the lowest score from each team's total and comparing the new total score
  - o If still tied, the next lowest score will be removed (on through all scores)
  - o If still tied, events may declare a tie, or elect to have a *Robot Skills Match* as a playoff to determine placement

Teamwork Challenge Finals Matches ● ● ● ● ● ● ● ● ● ● ● ●

- At the conclusion of *Qualification Matches*, the top teams will advance to the *Finals Matches*.
- There will be ten (10) teams in the *Finals Matches*.
- The first and second ranked teams form an alliance, third and fourth ranked teams form another alliance (and so on) for the Finals Matches.
- Starting with the lowest ranked alliance, each alliance participates in ONE Finals Match. After all the Finals matches are run, the highest score of those matches is the winning alliance. Second highest score finishes in second place, and so on. (If there is a tie, the higher ranked alliance, prior to the *Finals Matches*, shall be declared to finish higher)

Teamwork Challenge Rules ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

<T1> Referees have ultimate authority during the event. **Their rulings are final.**
a. The referees will not review any recorded replays*.*
b. Referees will review the field at the end of each match and accurately record the game score. If there is a disagreement with the scoring, only the team drivers, not an adult, may share their questions or concerns with the referee. Once the field is cleared for the next team, the drivers can no longer dispute the match score.

<T2> The only people from a team permitted to be by the playing field are the two drive team members, who are identified by their drive team badges. These badges are interchangeable, but not during a match.

<T3> During matches, two teams form an alliance that will play on the field.

<T4> There are no time outs in the *Qualifying Matches* or *Finals Matches*.

Awards

Awards Descriptions

Every team that participates in the exciting VEX IQ Challenge is a winner! Teams should consider their season a success, if they learned something new and had great fun in applying their new knowledge and skills to the Challenge, and to life in general. Events provide a great opportunity to share and recognize the accomplishments and contributions of all participants!

Additional recognition is provided in the form of event awards. Many local and qualifying events offer a standard set of awards that are based on the number of participating teams. Following is a standard set of awards that will be offered at most events.

- Excellence Award   Top All Around Team (Robot Performance and Judged)
- Teamwork Champion Award (2 teams)   Winning Teamwork Alliance (Robot Performance)
- Programming Skills Champion Award   Top Programming Skills Team (Robot Performance)
- Robot Skills Champion Award   Top Robot Skills Team (Robot Performance)
- Design Award   Professional approach to robot design (Judged)
- STEM Research Project Award   Best overall research project presentation (Judged)
- Sportsmanship Award   Demonstrates respect and great enthusiasm (Judged)
- Volunteer of the Year Award   Recognizes program/event volunteer

This standard set of awards, from the Excellence Award through the Robot Skills Champion Award, is listed and ranked in order of their qualification for advancement to a championship event. The number of awards selected as qualifiers for advancement depends on the capacity of the championship event. For a listing of the awards offered at your event and their qualifications for advancement to a championship event, check your event listing at www.Robotevents.com.

The World Championship may offer a combination of the following additional awards:

Robot Performance Awards, based on the team's performance in the Robot Challenge:

- Teamwork Finalist Award (2 teams)   Each Team on the Finalist Teamwork Alliance
- Robot Skills 2nd Place Award   Runner-Up Robot Skills Challenge Team
- Programming Skills 2nd Place Award   Runner-Up Programming Skills Challenge Team

Judged Awards – based on the deliberative decisions of a dedicated volunteer judging team:

- Amaze Award   Amazing, well rounded, and top performing robot
- Build Award   Sturdy, well-crafted robot
- Create Award   Robot with a creative engineering solution
- Elementary School Excellence Award   Top all around elementary school team
- Elementary School Design Award   Professional robot design approach by elementary team
- Energy Award   Team demonstrates extraordinary enthusiasm
- Inspire Award   Robot design that has earned the respect of peers
- Judges Award   Recognition from judges for special accomplishments
- Middle School Excellence Award   Top all around middle school team
- Middle School Design Award   Professional robot design approach by middle school team
- Think Award   Utilizes effective autonomous programming

Events may establish several different formats for judges to use to determine awards. Events may allocate a separate area where students can meet with judges, have judges roam the pits (practice area) and visit with students at their pit stations, or have judges and volunteers observe teams (how they work together, how they interact with other teams and volunteers, how they handle adversity or accomplishments) throughout the event day. Events, such as the World Championship, will use all three of these formats to judge teams for awards, while many smaller local/qualifying events may use one or two of these formats.

While the event provides an opportunity for parents, family, and friends to support the accomplishments of the teams, it is important that only the student team members participate in discussions with judges. In this way, the judges can make a first-hand evaluation of the students' learning experiences throughout the season. When making award decisions, judges will recognize those teams that have designed, built, and programmed their robot and completed their STEM research project, with minimal adult assistance.

Recognition of student accomplishments is also provided in the form of Online Challenge awards and prizes. The Online Challenge program gives students a virtual opportunity to solve engineering challenges. For more information on the Online Challenge program and awards, visit: http://forum.robotevents.com/design/

More detailed descriptions of VEX IQ awards are included in the "Awards Detail" section.

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Award Details

Excellence Award: Top All Around Team (Robot Performance & Judged)

The **Excellence Award** is the highest award presented in the VEX IQ Challenge. The recipient of this award is a team that exemplifies overall excellence in creating a well-rounded VEX IQ program. This team excels in many areas and is a shining example of dedication, devotion, hard work and teamwork. As a strong contender in numerous award categories, this team deserves to be recognized for building a quality robot and a "team" committed to quality in everything that they do.

Teams are given points towards the Excellence Award in the following categories:

- Teamwork Qualification Round Ranking
- Robot Skills Ranking
- Programming Skills Ranking
- STEM Research Project
- Engineering Notebook
- Judged performance in all other award categories at the event

Using this wide range of criteria, the Excellence Award will be presented to the team that excels in all areas in the VEX IQ Challenge. Note that some events may decide to offer two Excellence Awards, one for the top overall Elementary School team and one for the top overall Middle School team, if enough teams, in each category, participate in the event.

Robot Performance Awards

Robot Performance Awards are based on the team's performance in Teamwork Challenge matches, the Robot Skills Challenge, and the Programming Skills Challenge

Teamwork Champion: Each Team on 1st Place Teamwork Alliance
2nd Place Teamwork: Each Team on 2nd Place Teamwork Alliance
3rd Place Teamwork: Each Team on 3rd Place Teamwork Alliance

Robot Skills Champion: Top Robot Skills Team
2nd Place Robot Skills: Runner-Up Robot Skills Team
3rd Place Robot Skills: 3rd Place Robot Skills Team

Programming Skills Champion: Top Programming Skills Team
2nd Place Programming Skills: Runner-Up Programming Skills Team
3rd Place Programming Skills: 3rd Place Programming Skills Team

Judged Awards

Amaze Award: Team with an amazing, well rounded, and top-performing robot

The **Amaze Award** is presented to a team that has built a robot that clearly demonstrates overall quality. A solid mechanical design along with demonstrated robot programming, robustness, strong performance and consistency are key attributes for this award.

Key Criteria:

1. Robot design is consistently high-scoring
2. Robot is robustly constructed to fulfill its designed task
3. Robot autonomous mode is consistently successful
4. Demonstration of knowledge and teamwork skills in event activities and in discussion with judges.

Build Award: Team with a well-crafted robot

The **Build Award** is presented to a team that has built a well-crafted and constructed robot that also shows a clear dedication to safety and attention to detail, efficient use of mechanical and electronic components, and reliability on the field.

Key Criteria:

1. Robot construction is of high quality; robust, clean, and effective use of materials
2. Robot efficiently uses mechanical and electronic components
3. Robot is designed with detailed attention to the rigors of the Challenge
4. Demonstration of knowledge and teamwork skills in event activities and in discussion with judges.

Create Award: Robot with a creative engineering solution

The **Create Award** is presented to the team whose robot design incorporates a creative engineering solution to the design challenges of this year's game. Judges will be looking for teams who are able to demonstrate a highly creative engineering process that incorporates solid mechanical ability, unique design solutions, and innovative approaches to solving the Challenge.

Key Criteria:

1. Robot has a well-crafted, unique design solution, which demonstrates creative thinking
2. Team has demonstrated a highly creative design process and methodology
3. Team has committed to ambitious and creative approaches to solving the Challenge
4. Demonstration of knowledge and teamwork skills in event activities and discussion with judges.

Design Award: Team with a professional design approach documented in the Engineering Notebook

The **Design Award** is presented to a team that uses the Engineering Notebook to demonstrate: an organized and effective approach to the robot design process, project and time management skills, and team organization. The winning team will be able to describe how they implemented an efficient and effective design process to accomplish the project goals.

One of the primary missions of the VEX IQ Challenge is to help students acquire real-world life skills that will benefit them in their academic and professional future. The Engineering Notebook is a way for teams to document their learning experiences and demonstrate a better understanding of the engineering design process. It also serves as a historical guide of lessons learned and best practices.

The Engineering Notebook and the discussion with judges will demonstrate the team's ability to produce a student-built robot with minimal adult assistance.

Key Criteria:

1. The submitted Engineering Notebook is a clear, complete document of the team's robot design process
2. Team is able to explain the robot design and strategy that was used during the season
3. Team demonstrates personnel, time, and resource management throughout the season
4. Students explain the ways adults provided guidance during the season, while still ensuring that the students designed, programmed, and built the robot.

Energy Award: Team demonstrates extraordinary enthusiasm

The Energy Award is based on the team enthusiasm displayed and shared at the event. The winning team demonstrates boundless passion and energy throughout the event.

Inspire Award: Robot design that has earned the respect of peers

The **Inspire Award** is presented to a team that demonstrates outstanding leadership through their interactions with other teams. Their peers identify this team as a leader in innovative and creative design in the VEX IQ community. The recipient team serves as an example to others and embraces the concept of cooperative learning, by sharing their ideas. At the 2014 VEX Robotics World Championship, teams must submit nominations for this award to robotevents.com/vex awards/. The awards page will be available from February 1, 2014 until March 29, 2014.

Judges Award: Recognition from judges for special team accomplishments

The **Judges Award** is presented to a team that the judges decide is deserving of special recognition. Judges consider a number of possible criteria for this award: exemplary effort and perseverance at the event and/or team accomplishments throughout the season that may not fall under existing award categories, but are nonetheless deserving of special recognition.

Sportsmanship Award: Team that demonstrates respect and great enthusiasm for the VEX IQ experience.

The **Sportsmanship Award** is presented to a team that has earned the respect and admiration of the volunteers and other teams at the event. This team is a model for all to follow, as team members interact with everyone in a positive, respectful manner and in the spirit of friendly collaboration and cooperation. This award is judged during the event by teams, referees and volunteers.

Key Criteria:

1. Team is courteous, helpful and respectful to everyone at the event, on and off the field
2. Team interacts with others on the playing field in the spirit of friendly collaboration
3. Team demonstrates respect and willingness to help event staff, other teams, and spectators

STEM Research Project Award: Team that shares the best STEM Research Project presentation.

The **STEM Research Project Award** is presented to the team that develops and delivers an effective research project presentation and demonstrates a significant depth of understanding of their research topic. Additional details on the STEM Research Project are available in the VEX IQ Challenge documents.

Think Award: Awarded to a team that has impressed the judges during the Programming Skills Challenge.

The **Think Award** is presented to a team that impresses the judges with their programming and strategy during the Programming Skills Challenge.

Individual Awards

Volunteer of the Year Award: Recognized Program/Event Volunteer

VEX IQ events require the collective effort of many dedicated people, who are willing to give of their time and efforts, in order to provide a great learning experience for students. The Volunteer of the Year will be easy to spot because of his/her enthusiasm, dedication, and results-oriented approach to bringing the experience and opportunities available in VEX IQ to as many students as possible.